REMARKS:

Applicant requests favorable reconsideration of the Application. As set out in more detail below, Applicant has amended Claims 1 – 8, and 15 – 20 in a manner which is believed to traverse the Examiner's rejections under 35 U.S.C. § 112 and 35 U.S.C. § 103(a). Language in the amendments to the claims is fully supported by the specification; no new matter has been added. Applicant has provided a Marked-Up set of claims and a Claim List – Status and Support of Current Amendment Changes. For the Examiner's convenience, the substance of the pending Office Action is set out below followed by Applicant's responses.

RECEIVED
CENTRAL FAX CENTER
DEC 2 8 2006

PAGE 6/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

Applicant's Responses and Amendments to the Examiner's Rejections

RECEIVED
CENTRAL FAX CENTER
DEC 2 8 2006

35 USC § 112, second paragraph

As Applicant and the Examiner have worked the "family" and "variety" words extensively in both this file and in the combined re-exam/re-issue (90/005,710 / 09/733,392) file, Applicant is removing the word "variety" from claims 2, 3 and 20. Applicant is also rewording all claim limitations to DADMAC and epi-DMA so as to recite poly(DADMAC) and poly(epi-DMA), respectively.

Applicant is also inserting in this file technical arguments relating to the genus "polyquaternary amine", e.g. "polymeric quaternary ammonium compound". Specifically:

As defined by *Hawley's Condensed Chemical Dictionary* (Hawley's), an amine is defined as:

> **amine.** A class of organic compounds of nitrogen that may be considered as derived from ammonia (NH_3) by replacing one or more of the hydrogen atoms with alkyl groups. The amine is primary, secondary, or tertiary depending on whether one, two, or three of the hydrogen atoms are replaced. All amines are basic in nature, and usually combine readily with hydrochloric or other strong acids to form salt.

And, ammonium is defined by Webster's Ninth New Collegiate Dictionary (Webster's) as:

> **ammonium:** an ion NH_4^+ or radical NH_4 derived from ammonium by combination with a hydrogen ion or atom and known in compounds (as salts) that resemble in properties the compounds of the alkali metals and in organic compounds (as quaternary ammonium compounds)

And, quaternized nitrogen is defined in Hawley's as:

> **Quaternary ammonium salt.** A type of organic nitrogen compound in which the molecular structure includes a central nitrogen atom joined to four organic groups (the cation) and a negatively charged acid radical (the anion)."

And, poly is defined by Hawley's as:

> **Poly-,** A prefix signifying many. For example, a polymer is an aggregate formed by combination of a number of single molecules.

And, polymer is defined by Webster's as:

> **polymer:** a chemical compound or mixture of compounds formed by polymerization and consisting essentially of repeating structural units

PAGE 13/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

Therefore, a polymeric quaternary ammonium compound, e.g. polyquaternary amine, claimed in independent claims 1 and 16, as well as dependent claim 19, is a genus. This is while two species under that genus would be poly(DADMAC) and poly(epi-DMA).

Applicant is also rewording all claims stating "polyquaternary amine" to state "polymeric quaternary ammonium compound", as requested by the Examiner in the combined re-exam/re-issue.

35 USC § 103(a) Rejections

Eberhard – U.S. Pat. No. 5,019,267 to Eberhard ('267) teaches the use of chelating agents and enzymes to pretreat a sludge prior to dewatering the sludge with the use of a cationic polyacrylamide. Specifically, the '267 in col. 134 lines 13 – 21 states:

> "According to the invention, **the liquid organic matter to be treated is mixed** in a manner known per se with from about 0.001% to about 0.1% by weight, based on the organic share of dry matter, of a **chelating agent, suitably a salt of nitrilotriacetic acid, and with from about 0.001 to about 1.5% by weight of an enzyme or a mixture of enzymes** for breaking down the organic components of the solids contained, and intensively aerated in a bioreactor." **(Emphasis added)**

Further, the '267 in Example 1 col. 4 lines 18 – 36 states:

> "Crude sludge from a municipal sewage plant and containing 4% solids is homogenized in a crude sludge storage tank. The crude sludge is then quasi-continuously fed into the aerobic conditioning reactor by a flexible tube equipped with an inductive flow meter and a crude sludge feed pump. During this, **60 g of the triammonium salt of nitrilotriacetic acid, dissolved in about 30 l of tap water, are added. Furthermore, 60 g/m.sup.3 of chelating agent-containing crude sludge of a complex enzyme preparation composed of .beta.-glucanase, amylases, proteases and lipases is dissolved in about a 100 fold quantity of tap water and constantly fed in at certain doses.** About a tenth of the crude sludge is treated in a ball mill prior to being fed into the aerobic conditioning reactor. There the enzymes contained in the sewage sludge are released leading to reduced needs of added enzymes. A high rate aerator continuously recirculates the sludge in the aerobic conditioning reactor and supplies oxygen." **(Emphasis added)**

And, the '267 in col. 5 line 41 to col. 6 line 2 states:

> "**The sewage contains hard to decompose substituents and 3% solids and is pretreated as in Example 1.** In case of discontinuous aeration, a centrifugal pump is employed for supplementary recirculation.
>
> The crude sludge temperature is raised by the exothermal metabolic processes of the sludge microorganisms from 20 °C. to about 50 °C within 20 hours. The biological metabolic process and the mechanical action of the high-rate aerator result in a breakdown of organic substance into sludge particles of smaller sizes and thus higher specific surfaces.

PAGE 14/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

> The **sludge pretreated this way is discharged into an open-topped postreaction tank**. The high surface activity of the sludge particles provokes their reaggregation. Shear-stable agglomerates can form because of the fine primary particles created during the reaction phase. By the supply of foreign energy, the pretreated sludge is heated to a constant 50 °C so that the aggregation and degassing will be accelerated.
>
> After a reaction time of 15 hours, the sludge is mixed with Zetag 92 ACM/FRG cationic polymeric flocculant and is mechanically dewatered by a decanting centrifuge. The solids separation efficiency is 97-99%. The sludge liquor produced contains less than 0.1% by weight of dry substance and is recirculated for reuse to the head of the sewage plant. The dewatered sludge has a dry matter content of about 32% by weight and hence a high calorie value, a very fine particle size and a low water absorption capacity. It is almost completely odorless." **(Emphasis added)**

Therefore, the '267 teaches a method of chelant and enzyme treatment prior to the addition of a cationic polyacrylamide (Zetag 92).

After reviewing the '267, Applicant obtained an electronic copy of the '267 from uspto.gov and performed a word search for the terms "thermophile", "thermophilic", "quaternary", "quaternized", "polyquaternary", "di-allyl", "epi", "iron", "ferric", and "aluminum". These words do not even exist in the '267.

Therefore, the '267 does not teach or suggest the use of an iron or an aluminum salt in combination with a cationic or an anionic polyacrylamide to dewater a sludge of any type, much less to dewater a biological sludge from a thermophilic digestion process. This is while the '267 teaches steps not taught or required in the instant invention, e.g. chelating agents, enzymes and air.

Williams – U.S. Pat. No. 5,561,520 to Williams ('520) teaches an apparatus for measuring the properties of a slurry. Specifically, the abstract states:

> "An apparatus for measuring properties of a slurry which comprises a slurry transporting section (16), means for measuring (14a) at a first inspection site the particle size distribution of a slurry entering the transporting section, means for measuring (14b) at a second inspection site the particle size distribution of slurry leaving the transporting section and means for calculating (13a, 13b) from the particle size distribution measured at the first and second inspection sites a parameter related to the floc strength of the slurry which has passed between the first and second inspection sites. The transporting section may comprise a pipe which includes a flow constriction."

The is while the '520 does not teach or suggest to dewater a biological sludge, much less a biological sludge from a thermophilic digestion process. After reviewing the '520, an electronic copy of the '520 was obtained at uspto.gov. The '520 does not even contain the words "sludge", "bio", "thermophilic", "quat", "quaternized", "iron", "ferric" or "aluminum". The one

PAGE 15/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

demonstrative example in the '520 is the treatment of a "polydispersed silica" (col. 5 lines 66 – 67). There is no teaching or suggestion in the '520 to dewater a biological sludge, much less to dewater a biological sludge from a thermophilic digestion process.

Lo Sasso – U.S. Pat. No. 3,642,619 to Lo Sasso ('619) teaches the use of a non-ionic polyacrylamide with an iron salt to condition a sludge prior to dewatering. Specifically, the '619 in the abstract states:

> "Waste sludges are conditioned for dewatering by **intermixing with the waste sludge prior to dewatering an admixture of a water-soluble high-molecular weight nonionic polyacrylamide and a water-soluble salt containing ferric ions." (Emphasis added)**

Therefore, while the '619 does not teach or suggest the dewatering of a biological sludge from a thermophilic digestion process, the '619 teaches the use of a "non-ionic" polyacrylamide, which is a form of polyacrylamide which is specifically not claimed in the instant claims.

Further, the '619 does not teach or suggest the dewatering of biological sludge from a thermophilic digestion process; as, the '619 characterizes the various sludges to be dewatered while not teaching or suggesting a biological sludge from a thermophilic digestion process. Specifically, the '619 in col. 1 lines 20 – 35 states:

> "Waste water sludge is basically characterized according to three factors which are (1) sludge source, (2) sludge processing, and (3) degree of treatment. By "sludge source" is meant whether the sludge is from municipal (domestic) waste water or industrial waste water or a combination thereof. The sludge processing characteristic defines whether the sludge is raw untreated sludge, anaerobic or aerobic digested sludge, air flotation sludge or digested elutriated sludge. The degree of treatment indicates whether the sludge is primary sludge, activated sludge, waste activated sludge, chemically precipitated sludge, trickling filter humus or a combination of one or more of these such as waste activated sludge combined with primary sludge. It is generally accepted that each individual sludge has a different characterization and this sludge character more or less dictates the dewatering process used."

This is while the '619 in the section entitled "SUMMARY OF THE INVENTION" states in col. 2 lines 3 - 16:

> "We have found that **the dewatering of waste sludges is greatly enhanced if the sludge is treated prior to dewatering with an admixture of a water-soluble high-molecular weight nonionic polyacrylamide and a water-soluble salt containing ferric ions**. The waste sludge treated according to our invention dewaters better than sludge treated using prior art methods. **Chemical conditioning with an admixture of the polymer and ferric-containing salt yields a sludge which dewaters better than a sludge treated with the ferric-containing salt alone or the polymer alone**. It is also better than a sludge treated

PAGE 16/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

with the polymer followed by the ferric salt or the ferric salt followed by the polymer. We have found that the use of the admixture gives an unexpected synergistic result compared to the other methods of addition." **(Emphasis added)**

The teachings of the instant invention and the instant invention claims contrast the '619, '520, and '217 in that the instant invention claims require the use of an iron or aluminum slat with a cationic or anionic polyacrylamide. Independent claim 1 of the instant invention:

"A method for dewatering thermophilic biological sludge, comprising:

a. adding a primary component to the thermophilic biological sludge;

said primary component comprising at least one of aluminum sulfate and ferric chloride; wherein

said primary component may also comprise a polymeric quaternary ammonium compound; and

b. adding a **cationic or anionic polyacrylamide** to the thermophilic biological sludge."

(Emphasis added)

Further, Applicant has amended claims 16, 17 and 18 to recite "a cationic or an anionic polyacrylamide" instead of just a "polyacrylamide".

The above is while Dentel, e.g. Steven K. Dentel, *Evaluation of Dual Chemical Conditioning and Dewatering of Aerobically Digested Biosolids*, August 18, 1996, (previously cited in this proceeding as well as the combined re-exam/re-issue) teaches away from the use of a coagulant and a flocculant in combination to dewater biological sludge. Specifically, Dentel states on page 11 – 29 that:

"The use of ferric chloride or HDTMA (a quaternary salt) as a preconditioner can reduce the polymer requirement, but this is not a cost effective option at current prices for these additives."

This is while a second article by Dentel, *Evaluation of Dual Chemical Conditioning and Dewatering of Anaerobically Digested Biosolids*, June 1995, (previously cited in this proceeding as well as the combine re-exam/re-issue) concludes on page 9 that:

"As a rule of thumb, it appears that adding a proportion of one chemical's optimum dosage reduces the requirement for the other by the same amount. ..If this rule were invariably true, it would always be most economical to use only one of the conditioning chemicals by itself. However, the CST results also indicated that sole use of ferric chloride or HDTMA (quaternary salt) did not provide adequate dewaterability even at the optimum dose..."

And, on page 11 that:

PAGE 17/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

> "The use of ferric chloride or HDTMA (a quaternary salt) as a preconditioner can reduce the polymer requirement, this is not a cost effective option at current prices for these additives."

Therefore, at late as 1996, it was not known to be economical to "precondition" a biological sludge with an iron salt.

Neither, the '619, '520 or '217 teach the dewatering of biological sludge from a thermophilic digestion process or teach the need of an iron or an aluminum salt to overcome the repulsive forces present in a sludge from a thermophilic digestion process. A word search performed by Applicant in an electronic version of the '619, the '520 and the '217 cannot even locate the words "thermophile", "thermophilic", "repulsion", or "polysaccharide". In strong contrast to the '619, '520 and '217, the challenges associated with the dewatering of a biological sludge from a thermophilic digestion process are taught by Applicant. Applicant teaches in the instant invention specification col. 1 lines 50 – 34:

> "Meanwhile, traditional polyacrylamide polymers used for dewatering have been shown to **perform very poorly in tests for dewatering of sludge that has been digested by any thermophilic digestion process.**" **(Emphasis added)**

Applicant also teaches in the instant invention specification col. 2 lines 44 – 55:

> "Despite the disadvantages of mesophylic bacteria, **mesophylic bacteria are preferable in relation to the dewatering of digested sludge. Mesophylic bacteria naturally secrete a polysaccharide which acts as a tackifier providing a chemical mechanism of floc formation. This chemical mechanism is an aid to traditional cationic polyacrylamides to begin the dewatering process. However, thermophilic bacteria do not secrete a tackifying polysaccharide. Furthermore, thermophilic bacteria naturally repel each other.** This repelling nature of thermophilic bacteria makes the dewatering of sludge from the thermophilic digestion process expensive and difficult." (Emphasis added)

As none of the citations presented by the Examiner, the '619 or the '520 or the '267 teach the dewatering of a biological sludge from a thermophilic digestion process, there is no motivation to combine the '619, '520 and '267 to obtain the instant invention. And, even if such a combination were made, the resultant teaching would include at least one of: a "non-ionic polyacrylamide" which is not taught in the instant invention or claimed in the instant claims, the use of a "chelant" which is not taught in the instant invention or claimed in the instant claims, and the use of an "enzyme" which is not taught in the instant invention or claimed in the instant claims. This is while none of the '619, '520 or '267 teach the challenge associated with dewatering biological sludge from a thermophilic digestion process, as is taught by Applicant.

PAGE 18/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

In addition to the above arguments, Applicant would like to respectfully quote MPEP Section 2143.03 which states, "If an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending there from is non-obvious *In re Fine*, 837 F2d.1071, 5 USPQ 2d 1596, Fed. Cir. 1988." Therefore, Applicant herein respectfully requests an allowance of claims 2 – 5, 7 – 9, 15, 21/16, 21/17, 21/18 and 39/17 as amended herein, as the Examiner's argument has been traversed relating to: 1) independent claim 1 from which dependant claims 2 – 5, 7 – 9, and 15 depend and have priority; 2) independent claim 17 from which dependant claims 21 and 39 depend and have priority; 3) independent claim 16 from which dependant claim 21/16 depends and has priority; and 4) independent claim 18 from which dependant claim 21/18 depends and has priority.

As Applicant has respectfully traversed the Examiner's 35 U.S.C. 103(a) rejections, Applicant respectfully requests an allowance of all of the claims pending and amended herein. Applicant specifically requests an allowance of claims 1 – 5, 7 – 9, 15, 16, 17, 18, 21/16, 21/17, 21/18, and 39/17, as amended herein.

Case Law Supportive of Applicant

As none of the combinations cited by the Examiner teach the "source of the problem" in the dewatering of a biological sludge from a thermophilic digestion process, nor do any of the citations "contain the same solution for a similar problem", Applicant/Owner would like to cite MPEP 2141.02, which states:

> "**[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified.** This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103." *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). However, "discovery of the cause of a problem ... does not always result in a patentable invention. . . . **[A] different situation exists where the solution is obvious from prior art which contains the same solution for a similar problem.**" *In re Wiseman*, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (emphasis in original)." **(Emphasis added)**

Further, as none of the references cited, alone or in combination, teach or suggest all of the claim limitations of the instant invention claims, Applicant/Owner would like to cite MPEP 2143.02, which states:

> "To establish *prima facie* obviousness of a claimed invention, **all the claim limitations must be taught or suggested by the prior art.** *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "**All words in a claim must be considered in judging the patentability of that claim against**

PAGE 19/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending there from is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)." **(Emphasis added)**

PAGE 20/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04

CONCLUSION

Applicant respectfully requests entry of this amendment, along with favorable reconsideration of the pending claims. This amendment places the claims in a condition for allowance. The amendments to the claims do not raise any new matter issues and no additional searching is required. Additionally, Applicant requests that in view of this fact, the amendment be entered, and after due consideration of the facts presented herein, the claims be allowed and a certificate be issued.

To facilitate the resolution of any issues or questions presented by this paper, Applicant respectfully requests that the Examiner directly contact the undersigned by phone to further the discussion, reconsideration and allowance of the claims.

Respectfully submitted,

Date: December 28, 2006

Richard A. Haase, Pro Se' Applicant

Richard A. Haase
4402 Ringrose Drive
Missouri City, Texas 77459

Telephone: 281.261.9543
Facsimile: 281.261.6505
richard@clearvalue.com

PAGE 21/31 * RCVD AT 12/28/2006 5:47:57 PM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/19 * DNIS:2738300 * CSID:2812616505 * DURATION (mm-ss):17-04